

Alan Jones' maths mockery

In his various broadcasts Alan Jones claims that Maths makes a Mockery of climate change theory...

CO₂ is an invisible gas, essential for plants and not a pollutant.

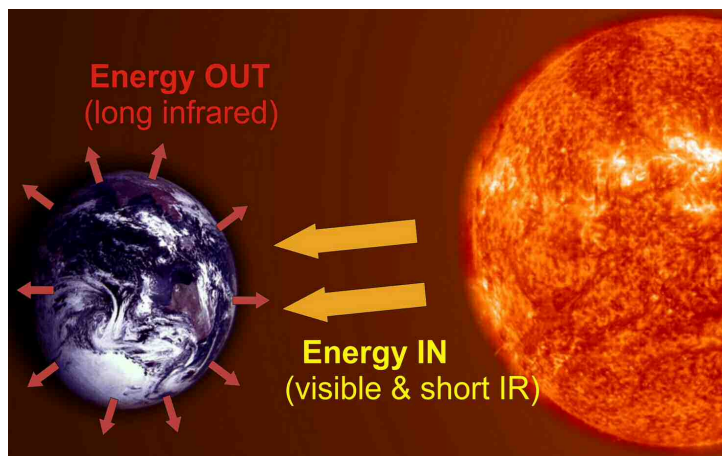
First two are true, and yes, it is not a pollutant in the ordinary sense of the world, but this is irrelevant as far as global warming is concerned. However, he goes on to say:

CO₂ is only 0.04% of the atmosphere [and so can't have much effect]

The 0.04% is correct, but it, along with water vapour and methane, is responsible for almost all of the greenhouse effect which keeps the Earth at a mild +15°C rather than the frozen -18°C it would be otherwise. In other words it is responsible for a vital life-giving +33°C of "global warming". So it may be a small amount, but it has a LARGE EFFECT!

A very simple (and simplified) physics lesson: The Earth's average temperature is the result of a balance between incoming heat energy from the Sun and outgoing heat energy from the Earth. The incoming energy is short-wavelength infrared (IR) and visible radiation from the Sun. The outgoing is long-wavelength (invisible) IR from the warmed Earth. When they are in balance the Earth stays the same average temperature.

Now the nitrogen and oxygen in the atmosphere (ie., 99% of it) have no effect on either the incoming or outgoing IR radiation. However, the CO₂ (and other greenhouse gases) while having little effect on the incoming radiation, absorb a lot of the outgoing (long wavelength IR) radiation - thus trapping heat in the atmosphere. Thus the Earth warms until the amount of outgoing IR radiation once again equals the incoming IR radiation. So if we increase the CO₂ in the atmosphere the Earth MUST warm until the balance is restored.



That a small amount of an active ingredient can have a relatively large effect is nothing new. A simple demonstration can illustrate the point: If we put about two drops of ink into a glass of water that's about 0.04%, or 400 parts per million (ppm) - but it makes a BIG difference to the amount of light transmitted through the water.



The CO₂ acts like the ink and the water the atmosphere. CO₂ absorbs IR radiation from the Earth that would otherwise escape into space. So yes, a small amount of CO₂ can have a big effect on the Earth's temperature. Water vapour is also a greenhouse gas (GHG), but for more complicated reasons the amount of water vapour is very dependent on the amount of CO₂ and so it is CO₂ which is the key GHG.

The big difference is that once CO₂ is put in the atmosphere it stays there for a century or so, while water vapour goes in and out all the time as evaporation and rain. Scientists call CO₂ a "forcing GHG" while water vapour is a "feedback GHG".

CO₂ is now over 0.04% – but it used to be less than 0.03%!

We have increased the CO₂ from 280 ppm (0.028%) to 410 ppm, that is a 46% increase! However, Jones claims that...

Humans only contribute 3% of the CO₂ in the atmosphere.

Each year huge amounts of CO₂ go in and out of the biosphere in the natural processes of photosynthesis and decay - around 800 billion tonnes every year. This has been in balance for thousands of years. But each year we humans, by burning fossil fuels, have added around 40 billion tonnes of CO₂ to the atmosphere. While about half of that goes into the ocean (making it more acidic!) the rest stays in the atmosphere. So, yes, we are adding around 5% of CO₂ to the natural cycle every year. (Jones' 3% is approximately the amount that stays in the atmosphere.)

But this extra 3% every year has now added up to 46% more CO₂ than was in the atmosphere before we started burning fossil fuels. (That is the increase from 280 ppm to 410 ppm.)

So, we have increased the main GHG by 46% and must expect that comfortable +33°C greenhouse effect to increase. And it has - so far by about one degree. Even if we stopped all GHG emissions today the temperature would keep going up for decades because it takes a long time for such a huge climate system to get into balance.

And so we come to Jones' last "little" number: *Australia only contributes 1.3% of the world's GHG emissions*

Yes, but that is from only 0.3% of the world's population! That is, we contribute over 4 times our fair share!

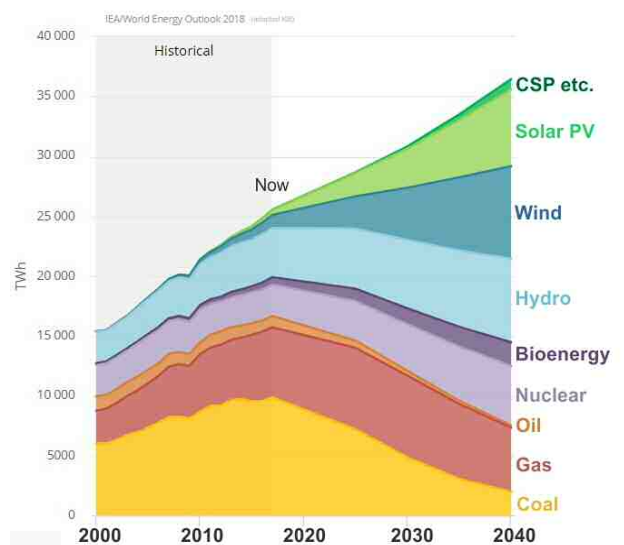
Yet we have the best renewable energy resources in the world and so could "do our bit" much more easily than most of the world's nations could.

Indeed, if we collected only 5% of the solar energy falling on an area the equivalent of a square 100 km x 100 km - but distributed around the sunny parts of our country - we could power ALL of our energy needs, not just electricity generation. That square is only 0.13% of our land area. But of course we have lots of wind energy as well, so we don't even need that much. This would be much more difficult for many countries, so we have a responsibility to lead.

To suggest that because we are small we don't need to play our part is rather astounding. (Does Jones think that I shouldn't bother paying tax because I contribute so little?) Any small state in the USA or China could say the same thing - but the "big" emitters are just the sum of the small ones. Any sense of ethics tells us we should play our part. But Jones claims:

We are "wallowing in this ideological rubbish", standing our economy on its head, demonising coal, turning to renewable energy - which is not available, reliable or affordable - plonking us in electric cars, giving us the dearest electricity in world. We are putting industry at risk, jobs at risk and committing national economic suicide.

IEA - Electricity generation by technology (SDS)



Far from it!

It is good sound science, not ideological rubbish! Furthermore, the world is turning away from coal and fossil fuels. Even the IEA (International Energy Agency) with its "Sustainable Development Scenario" (SDS) says that by 2040 coal could drop to only 5% of world electricity generation while total renewables (& nuclear) rise to 80%.

Australia, with its vast renewable resources could become a world leader in utilising and exporting clean energy. Around the world, industry will be looking to countries where there is cheap plentiful renewable energy. Australia is probably the best placed in the world to satisfy this demand. We should be developing this technology to both utilise it ourselves and export it to the world.

For example, we can effectively export clean energy by mining AND smelting iron ore and exporting the iron and steel, rather than just exporting the ore and letting other countries benefit from the processing (while also probably using dirtier energy).

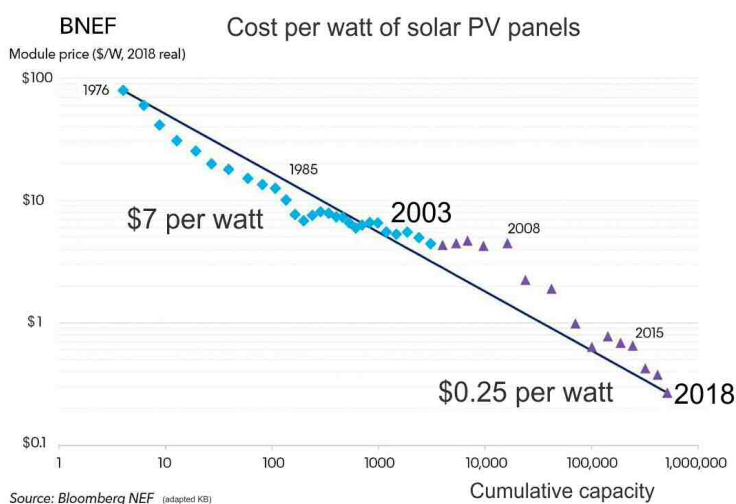
Solar and wind energy costs have been dropping and are continuing to drop to the point where they are now much cheaper than new fossil energy and soon will be cheaper than simply keeping on using old fossil power. They are certainly cheaper than nuclear energy could ever possibly be in Australia. Our high energy costs are not due to renewable energy, they are due to policy confusion and government inaction. By efficiently utilising cheap new renewable energy our power costs could become the lowest in the world rather than among the highest.

BUT, yes, it will require very large capital costs to build solar and wind farms, to strengthen the grid and build battery and pumped hydro storage in the time frame needed. But it will generate lots of new jobs - and lots of "economic activity".

There will be big challenges, and we will certainly need to look after those who are displaced from the fossil power industry. The long term rewards, however, will be huge. Australia should be looking to become a **clean energy superpower** based on the best science and technology, not a country stuck in the past by an ideological fixation with old dirty energy.

However, there is an even bigger reason to go down this road. If we, and the rest of the world, don't act urgently to curb global warming we could well see the end of civilized society. As coastal croplands fail and coastal cities flood there would be huge social unrest - leading to enormous starvation, massive immigration and consequently a huge increase in terrorism.

To avoid the worst consequences of climate change we may face some big costs in the short term, but the cost to our children and grandchildren of not acting would be horrendous.



Source: Bloomberg NEF (adapted KB)